Io's Mid-IR Volcanic Thermal Emission at the Galileo Epoch

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We have measured Io's volcanic thermal emission at 4.8, 8.7, 12.5, and 20μm at all orbital longitudes on May 21-25, June 28-July 3 (G1), August 21-26, 1996 UT (just before G2). This poster compares our most recent results to similar measurements that we have been making since 1983 using the NASA IRTF and other telescopes as part of the IJW program. Galileo measurements show striking evidence of Io's volcanic surface activity, as did Voyager. The goal of this poster is to establish the historical context in which the new Galileo results should be viewed.

Through 1993, the main results of our program of mid-infrared Io radiometry are published in Veeder *et al. (J. Geophys. Planets* **99**, 17095-17162, 1994). These observations, augmented with more recent data, define the baseline and range of historical brightness variations at wavelengths from 4.8 to 20μm. This wavelength range includes the region of the peak of Io's volcanic thermal emission and spans a gap in Galileo's spectral coverage between the NIMS and PPR instruments.

We conclude that between May 21 and August 26, 1996 UT:

1) Io's mid-IR thermal emission is near the minimum of the observed range. The 1996 rotational lightcurves are similar to those measured in 1993 and 1995. The Galileo G1 (and likely also the G2) data show Io near its minimum level of volcanic activity.

2) The nearly constant value of the 8.7μm emittance, which is dominanted by hot spot emission, with orbital longitude on Io's leading hemisphere suggests multiple small sources, e.g. many small cooling flows. A single large source would produce a maximum at the source longitude.

3) The maximum 8.7μm thermal emission from Io's trailing hemisphere occurs at 280 W longitude, eastward from Loki (310 W), indicating that an additional source, perhaps Pele, contributes significantly.

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